# Anti-Misinsertion Mechanism of Card Connector

## FIELD OF INVENTION

This invention relates to the technology of recognizing card thickness in a mechanical manner to prevent reading of improper cards by a terminal.

## BACKGROUND OF INVENTION

Since the invention of the first IC card by Piland Moreno in 1970, IC card technology has been widely implemented in various fields. The main applications of IC cards are in the fields of IC smart cards and IC memory cards. However, other types of cards are also applicable. Smart cards are of a thinner profile, having a configuration similar to a credit card and a thickness of approximately 0.76 mm. Known applications of smart cards include banking, health care, telecommunication and MRT systems. Memory cards also known as PCMCIA cards or PC cards, which are of a thicker profile, have a dimension similar to a business card and follow the protocols established by the Personal Computer Memory Card International Association. There are three types of PCMCIA cards, which are Type I (3.3 mm), Type II (5.5 mm) and Type III (10.5 mm). Known applications of PCMCIA cards include electronic or video games, electronic dictionaries, modems, audio and Ethernet cards.

With the flourishing developments of technology nowadays, there are various means for recording data. The trend of allowing a single terminal to access a smart card and a PC card simultaneously is inevitable. However, due to the similar dimensions of a smart card and a PC card, an IC card having a thinner profile may be inadvertently inserted into a cardbus adapted to a memory card, which may cause system errors. Hence, it is necessary to provide an anti-misinsertion mechanism for preventing misinsertion of a thinner smart card into a cardbus adapted to a memory card, which may cause system errors.

## SUMMARY OF INVENTION

It is, thus, a primary objective of this invention to provide an anti-misinsertion mechanism for selectively preventing full insertion of a card after determining whether the partially-inserted card is of a proper thickness.

To achieve this objective, this invention discloses an anti-misinsertion mechanism comprising: a body, a first link, a second link, and a recovering means. The first and second links are pivotally provided to the body and operatively connected to each other. The first link includes an actuator for detecting the thickness of a partially-inserted card. The second link includes a stopper for selectively preventing full insertion of the card. When the first link detects existence of the correct thickness of a partially-inserted card, the first link is rotated to drive the second link to disable the stopper and allow full insertion of the card. When the first link fails to detect existence of the correct thickness of a partially-inserted card, the stopper of the second link prevents the card from being fully inserted.

This invention also provides a recovering mechanism for returning the anti-misinsertion mechanism to its original position after each use.

The structures and characteristics of this invention can be realized by referring to the appended drawings and explanations of the preferred embodiments.

## BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a schematic view of an anti-misinsertion mechanism mounted to a cardbus.

Fig. 2 is an exploded, perspective view of an anti-misinsertion mechanism according to the present invention.

Fig. 3 is an assembled view of an anti-misinsertion mechanism according

to the present invention.

Fig. 4 is a schematic view illustrating the insertion of a card not of a proper thickness into a cardbus.

Fig. 5 is a schematic view illustrating the insertion of a card having a proper thickness into a cardbus.

Figs. 6a to 6c illustrate the detailed operations of the anti-misinsertion mechanism during the insertion of a card having a proper thickness into a cardbus.

Figs. 7a and 7b are exploded and assembled, exploded views of an alternative embodiment according to the present invention.

## DETAILED DESCRIPTIONS OF EMBODIMENTS

Fig. 1 is a schematic view of an anti-misinsertion mechanism 1 mounted to a card connector assembly (hereinafter referred to as cardbus D for example). The anti-misinsertion mechanism 1 comprises: a body 10, a first link 20, a second link 30 and a recovering means.

As illustrated in Figs. 2 and 3, the body 10 may be assembled to the cardbus D for mounting the anti-misinsertion mechanism 1. The body 10 is preferably assembled to a location neighboring an opening of the cardbus D.

The first link 20 generally extends along a longitudinal direction of the body 10 and is pivotally coupled to the body 10 to rotate between a normal position and an operating position. The first link 20 includes an actuator 22 and a tail 24. The actuator 22 is preferably a tab projecting into a slot CH (Fig. 1) of the cardbus D for detecting whether a card C partially inserted into the slot CH has a proper thickness.

The second link 30 generally extends along a longitudinal direction of the

body 10 and is pivotally coupled to the body 10 to rotate between a normal position and an operating position. The second link 30 includes a stopper 32 and a tail 34. When the second link 30 is under normal position, the stopper 32 extends into the slot CH to prevent full insertion of the card C into the cardbus D. When the second link 30 is rotated to operating position, the stopper 32 is receded from the slot CH and thus becomes disabled, to allow full insertion of the card C into the cardbus D. The tail 34 connects to and the tail 24 of the first link 20, in an end-to-end fashion, to form an operative connection between the first link 20 and the third link 30. In other words, rotation of one of the first and second links will drive rotation of the other of the first and second links.

The recovering means subjects the first link 20 to return to normal position from operating position. The recovering means is preferably a spring 40 providing biasing resilience between the first link 20 and a fixed object (such as the cardbus D). The spring 40 preferably includes a first end 42 and a second end 44, which are each biased against the first link 20 and the fixed object to provide a torque for rotating the first link 20. A pivot 50 is fixed to the first link 20 for mounting the spring 40.

Fig. 4 is a schematic view illustrating the insertion of a card C not of a proper thickness into the cardbus D. When inserting a card C not of a proper thickness into the cardbus D, the actuator 22 cannot be actuated because the card C passes underneath the actuator 22, such that the stopper 32 still remains in the slot CH for preventing full insertion of the card C.

Figs. 5 and 6a to 6c illustrate the detailed operations of the anti-misinsertion mechanism 1 during insertion of a card C having a proper thickness into the cardbus D. When inserting a card C having a proper thickness into the slot CH, the card C will press against the actuator 22 subjecting the stopper 32 to recede from the slot 32 to disable the stopper 32. When removing the card C from the cardbus D, the torque of the spring 40 will

returns the first link 20 to its normal position, where the actuator 22 re-enters the slot CH.

Figs. 7a and 7b are exploded and assembled, exploded views of an alternative embodiment of the anti-misinsertion mechanism 100 according to the present invention, derived from the operation principles disclosed in Figs. 1 to 6c. The anti-misinsertion mechanism 100 comprises: a body 110, a first link 120, a second link 130, a recovering means and a lid 150.

The operations of this embodiment are substantially identical to those of the first embodiment. The first link 110 generally extends along a longitudinal direction of the body 110 and pivotally coupled to the body 110 to rotate between a normal position and an operating position. The first link 110 includes an actuator 122 and a tail 24. The second link 130 generally extends along a longitudinal direction of the body 110 and pivotally coupled to the body 110 to rotate between a normal position and an operating position. The second link 130 includes a stopper 132 and a tail 134. The recovering means subjects the first link 120 to return to the normal position from the operating position. Biasing resilience is provided between the first link 120 and the lid 150. The recovering means is preferably a spring 140 having a first end 142 and a second end 144 that are each biased against the first link 120 and the lid 150 to provide a torque for rotating the first link 120. The lid 150 and the body 110 are coupled to each other by at least one fastener 170. This invention can be applied whenever two types of cards having different thickness are used. For example, this invention is useful when the connector assembly is a stacked type connector. (Two different types of cards having different thickness are inserted to different slots respectively.)

This invention is related to a novel creation that makes a breakthrough in the art. Aforementioned explanations, however, are directed to the description of preferred embodiments according to this invention. Various changes and implementations can be made by persons skilled in the art without departing

from the technical concept of this invention. Since this invention is not limited to the specific details described in connection with the preferred embodiments, changes to certain features of the preferred embodiments without altering the overall basic function of the invention are contemplated within the scope of the appended claims.

## LISTING OF NOMENCLATURES

| | | | |
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| 1 | anti-misinsertion mechanism | 10 | body |
| 20 | first link | 22 | actuator |
| 24 | tail | 30 | second link |
| 32 | stopper | 34 | tail |
| 40 | recovering means/spring | 42, 42 | first end and second end |
| 50 | pivot | 100 | anti-misinsertion mechanism |
| 110 | body | 120 | first link |
| 122 | actuator | 124 | tail |
| 130 | second link | 132 | stopper |
| 134 | tail | 140 | recovering means/spring |
| 142 | first end | 144 | second end |
| 150 | lid | 170 | fastener |
| C | card | CH | slot |
| D | cardbus | | |